

What is claimed is:

1. A plasma cleaning device comprising:

a chamber for cleaning a process target disposed therein with a plasma,

5 the chamber having an exhaust mechanism evacuating the chamber to a reduced pressure therein lower than the atmospheric pressure;

a process gas introducing mechanism for introducing a process gas into the chamber;

10 opposite electrodes of a pair of an active electrode and an earth electrode grounded which are housed in the chamber;

a plasma generating power supply connected to the active electrode for supplying a power supply for use in generating the plasma in the chamber;

a disposing position of the process target for disposing the process target outside a space between the opposite electrodes; and

15 an electrically conductive path connected to the process target.

2. The plasma cleaning device according to claim 1, wherein the

disposing position of the process target is at the other side of the earth electrode from the active electrode.

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3. The plasma cleaning device according to claim 1, wherein the

electrically conductive path is provided with an auxiliary power supply applying a potential to the process target.

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4. The plasma cleaning device according to claim 3, wherein the

auxiliary power supply is a DC power supply.

5. The plasma cleaning device according to claim 4, wherein an output

potential of the DC power supply is variable.

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6. The plasma cleaning device according to claim 3, wherein the auxiliary power supply is an AC power supply.

5 7. The plasma cleaning device according to claim 3, wherein a resistor is connected between the auxiliary power supply and the process target.

8. The plasma cleaning device according to claim 3, wherein a diode is connected between the auxiliary power supply and the process target so that the process target side thereof is the anode thereof.

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9. The plasma cleaning device according to claim 3, wherein a series circuit of a resistor and a diode is connected between the auxiliary power supply and the process target, the diode being connected so that the process target side thereof is the anode thereof.

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10. The plasma cleaning device according to claim 3, wherein the auxiliary power supply is provided with a protective circuit against a current flowing thereinto from the process target.

20 11. The plasma cleaning device according to claim 10, wherein the protective circuit is a resistor connected in parallel to the auxiliary power supply.

12. The plasma cleaning device according to claim 10, wherein the protective circuit is a parallel circuit of a resistor and a capacitor connected in parallel to the auxiliary power supply.

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13. The plasma cleaning device according to claim 1 or 2, wherein an insulating cover is disposed in the chamber,
the insulating cover covering the pair of opposite electrodes and the
30 disposing position of the process target,

and the insulating cover having an opening through which a process gas flows.

14. The plasma cleaning device according to claim 1 or 2, wherein
5 plural sets of the pair of opposite electrodes and the disposing position of the process target are provided in a common chamber,

a space in the chamber is partitioned into subspaces for the sets so that a plasma is generated by each of the sets in a corresponding subspace independently of the other sets, and

10 the electrically conductive path is also connected to the process target of each of the sets.

15 15. The plasma cleaning device according to claim 14, wherein the active electrode of each of the sets is connected to the plasma generating power supply through a corresponding resistor in parallel each other.

16. The plasma cleaning device according to claim 1 or 2, wherein the process gas is air.

20 17. The plasma cleaning device according to claim 1 or 2, wherein an inlet port for the process gas is provided to a vent pipe of the chamber.

25 18. The plasma cleaning device according to claim 1 or 2, further comprising a reflecting electrode in an electrically floating state at the other side of the active electrode from the earth electrode.